

Environmental Science Curriculum  
Dual – Credit with Morrisville

1. Introduction to Environmental Science (5 days)
  - Describe the three categories into which most environmental problems fall
  - Explain how the population crisis and the consumption crisis contribute to environmental problems.
  - Distinguish between renewable and nonrenewable resources.  
Learning standards – MST 2, 4, and 6
  
2. The application of science to solve environmental problems. (5 days)
  - Distinguish between pure and applied science.
  - Describe scientific methods.
  - Explain the uses of tables, line graphs, bar graphs and pie charts.  
Learning standards – CDOS 1, ELA 1 and 4, MST 1, 2, and 4  
Activity: An Onion Conundrum
  
3. The identification of ecosystems and their management, and the identification of biomes. (15 days)
  - Distinguish between the biotic and abiotic factors in an ecosystem
  - Explain the terms population and community
  - Explain the five major types of species interactions and give examples of each
  - Explain the concept of biodiversity
  - Discuss why many believe that biodiversity contributes to ecological stability
  - Define a biome
  - Compare and contrast the world's biomes
  - Describe plant and animal adaptations in each biome
  - Explain why biodiversity is so much greater in the tropics than in cooler regions of the planet  
Learning standards – SS 3, and MST 6  
Activities: Research and build a model of a biome  
Aquaculture  
Design a composting unit
  
4. Soils – land use and forestry (35 days)
  - Describe the physical properties that determine the value of soil
  - List and describe the eight land use classes
  - Describe major mechanical and ecological means of erosion control
  - Define suburban sprawl and explain why it is considered a problem
  - Explain how logging, ranching and mining activities affect the land
  - Discuss the role of trees in human thinking
  - Outline some of the major contributions of trees to the environment
  - Discuss the negative impacts of the environment from some forestry activities

Learning standards – MST 1, 2, 4, 5, 6, and 7, and A 3

Activities: Soil judging  
Determine the physical characteristics of the soil  
Learn to use soil survey maps provided by SCS  
Identify the parts of a tree and determine its age  
Identify trees from the FFA's CDE – tree id  
Calculate the ecological dominance, and frequency  
Determine board feet

5. Water resources (15 days)

- Explain why fresh water is a precious resource
- Describe our main sources of fresh water
- Explain why fresh water is often in short supply
- Explain why groundwater pollution is hard to clean
- Define and compare point and nonpoint pollution
- Describe the impact of water pollution on people and the environment
- Discuss the effects of polluted oceans on humans

Learning standards – HPE 2, and MST 1, 4, 6, and 7

Activities: Water testing  
Stream study  
Groundwater flow models  
Groundwater levels and wetlands

6. Air quality (15 days)

- Name the major causes of air pollution
- Explain how we could reduce air pollution
- Explain how a thermal inversion can make air pollution worse
- Describe some possible health effects of air pollution
- Explain what causes indoor air pollution and how it can be prevented
- Explain what causes acid precipitation
- Explain how acid precipitation affects ecosystems
- Explain why the earth and its atmosphere are like a greenhouse
- Explain why carbon dioxide levels in the atmosphere are rising
- Explain why many scientists think that the earth's climate will get warmer
- Describe what a warmer earth might be like
- Explain how the ozone layer shields the Earth from much of the sun's harmful radiation
- Explain how CFC's are damaging the ozone layer
- Describe the damaging effects of excessive ultraviolet light.

Learning standards – HPE 2, and MST 1, 4, 6, and 7

Activities: Study acid precipitation affect on plants  
Monitor air quality  
Global warming in a jar

7. Energy (20 days)

- Explain how fossil fuels are used to produce electricity
- Explain how our major sources of energy are dwindling
- Explain the advantages and disadvantages of nuclear energy
- Describe methods of conserving energy
- Describe several alternative energy sources

Learning standards – MST 3, 4, and 5 and SS 2 and 3

Activities      solar oven  
                         Research project

8. Wildlife biology and management (15 days)

- Explain the five major types of species interactions and give examples of each (ex.-perdition)
- Explain the requirements for habitat
- Explain the importance of game laws
- Explain methods of survival when food supplies are short
- Draw a food web
- Explain the concept of adaptation
- Define the term extinction, and explain the influence of man
- Describe the main provisions of the Endangered Species Act
- Discuss controversies about efforts to protect endangered species

Learning standards – MST 1, 4, 6, and 7 and ELA 2 and 3

Activities      Research project on endangered species  
                         Habitat improvement

9. Population ecology – food (5 days)

- Describe the factors that affect a population's size
- Explain why populations grow and what will limit that growth
- Describe how the size of the human population has changed
- Describe the problems stemming from overpopulation
- Explain why providing adequate food for all of the world's people is so difficult
- Describe the advantages and disadvantages of the green revolution

Learning standards – MST 3, 6, and 7 and SS 2 and 3

Activities

10. Integrated Pest Management (IPM), chemicals and the environment (15 days)

- Explain why pest control is often necessary
- Explain how insects can become resistant to pesticides
- Discuss biological pest and disease control procedures that can be used in crop production
- Discuss the implications of organic gardening and organic farming on human society
- Discuss the relationships between agriculture pest control practices and the environment

- Discuss the potential positive and negative effects of chemical fertilizers in the environment

Learning standards – HPE 2, and MST 3, 4, 6, and 7

Activities      build bat houses  
                     Pest identification  
                     Determine threshold limits of pests  
                     Examine a leaf for pests

#### 11. Waste management

- Define solid waste
- Explain how most municipal solid waste is disposed of
- Describe three ways to reduce the amount of waste that goes to landfills and incinerators
- Define hazardous waste
- Explain how most hazardous waste is disposed of in the United States
- Explain the two best ways to deal with the hazardous waste problem

Learning standards – HPE 2, and MST 1 and 4

Activities      Build a model landfill, weigh and record changes in materials  
                     Build a model of wastewater treatment facility  
                     Field trips

#### 12. Students will design and carry out a long-term experiment, which will be based upon a current environmental issue.

Learning standards ELA 1 and 3, CDOS 1 and 2, and MST 1, 2, 3, 4, 5, 6, and 7

## **Learning Standards for New York State**

### **Health, Physical Education, and Home Economics**

- Standard 1 Personal health and fitness
- Standard 2 A safe and healthy environment
- Standard 3 Resource management

### **Mathematics, Science and Technology**

- Standard 1 Analysis, inquiry and design
- Standard 2 Information systems
- Standard 3 Mathematics
- Standard 4 Science
- Standard 5 Technology
- Standard 6 Interconnectedness: common themes
- Standard 7 Interdisciplinary problem solving

### **The Arts**

- Standard 1 Creating, performing and participating in the arts
- Standard 2 Knowing and using arts materials and resources
- Standard 3 Responding to and analyzing works of art
- Standard 4 Understanding the cultural contributions of art

### **Career development and Occupational Studies**

- Standard 1 Career development
- Standard 2 Integrated learning
- Standard 3 Universal foundation skills

### **English Language Arts**

- Standard 1 Language for information and understanding
- Standard 2 Language for literary response and expression
- Standard 3 Language for critical analysis and evaluation
- Standard 4 Language for social interaction

### **Social Studies**

- Standard 1 History of the United States and New York
- Standard 2 World history
- Standard 3 Geography
- Standard 4 Economics
- Standard 5 Civics, citizenship and government